

## NTA JEE Mains Jan 2026

Application No	260310534069
Candidate Name	SHRISH BINDAL
Roll No.	DL010101421
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Subject	B. Tech

Section : Mathematics Section A

Q.1

If the function  $f(x) = \frac{e^x(e^{\tan x - x} - 1) + \log_e(\sec x + \tan x) - x}{\tan x - x}$  is

continuous at  $x = 0$ , then the value of  $f(0)$  is equal to

Options 1. 2

2.  $\frac{2}{3}$

3.  $\frac{1}{2}$

4.  $\frac{3}{2}$

Question Type : MCQ

Question ID : 444792542

Option 1 ID : 4447921853

Option 2 ID : 4447921851

Option 3 ID : 4447921850

Option 4 ID : 4447921852

Status : Answered

Chosen Option : 4

**Q.2** From a lot containing 10 defective and 90 non-defective bulbs, 8 bulbs are selected one by one with replacement. Then the probability of getting at least 7 defective bulbs is

- Options
1.  $\frac{73}{10^8}$
  2.  $\frac{7}{10^7}$
  3.  $\frac{81}{10^8}$
  4.  $\frac{67}{10^8}$

Question Type : **MCQ**  
Question ID : **444792534**  
Option 1 ID : **4447921818**  
Option 2 ID : **4447921819**  
Option 3 ID : **4447921820**  
Option 4 ID : **4447921821**  
Status : **Not Answered**  
Chosen Option : --

**Q.3**

$$\text{Let } f(t) = \int \left( \frac{1 - \sin(\log_e t)}{1 - \cos(\log_e t)} \right) dt, t > 1.$$

If  $f(e^{\pi/2}) = -e^{\pi/2}$  and  $f(e^{\pi/4}) = \alpha e^{\pi/4}$ , then  $\alpha$  equals

- Options
1.  $1 + \sqrt{2}$
  2.  $-1 - \sqrt{2}$
  3.  $-1 - 2\sqrt{2}$
  4.  $-1 + \sqrt{2}$

Question Type : **MCQ**  
Question ID : **444792544**  
Option 1 ID : **4447921860**  
Option 2 ID : **4447921859**  
Option 3 ID : **4447921858**  
Option 4 ID : **4447921861**  
Status : **Answered**  
Chosen Option : **2**

Q.4 If the domain of the function

$$f(x) = \log_{(10x^2 - 17x + 7)}(18x^2 - 11x + 1)$$

is  $(-\infty, a) \cup (b, c) \cup (d, \infty) - \{e\}$ , then

$90(a + b + c + d + e)$  equals:

Options 1. 307

2. 177

3. 170

4. 316

Question Type : MCQ

Question ID : 444792527

Option 1 ID : 4447921791

Option 2 ID : 4447921793

Option 3 ID : 4447921792

Option 4 ID : 4447921790

Status : Answered

Chosen Option : 4

Q.5 The number of the real solutions of the equation:

$$x|x + 3| + |x - 1| - 2 = 0 \text{ is}$$

Options 1. 4

2. 3

3. 2

4. 5

Question Type : MCQ

Question ID : 444792530

Option 1 ID : 4447921805

Option 2 ID : 4447921803

Option 3 ID : 4447921802

Option 4 ID : 4447921804

Status : Answered

Chosen Option : 2

Q.6

Let  $\alpha, \beta \in \mathbb{R}$  be such that the function  $f(x) = \begin{cases} 2\alpha(x^2 - 2) + 2\beta x & , x < 1 \\ (\alpha + 3)x + (\alpha - \beta) & , x \geq 1 \end{cases}$

be differentiable at all  $x \in \mathbb{R}$ . Then  $34(\alpha + \beta)$  is equal to

- Options 1. 84  
2. 24  
3. 48  
4. 36

Question Type : MCQ

Question ID : 444792543

Option 1 ID : 4447921857

Option 2 ID : 4447921854

Option 3 ID : 4447921856

Option 4 ID : 4447921855

Status : Answered

Chosen Option : 3

Q.7

Let  $\vec{a} = 2\hat{i} + \hat{j} - 2\hat{k}$ ,  $\vec{b} = \hat{i} + \hat{j}$  and  $\vec{c} = \vec{a} \times \vec{b}$ . Let  $\vec{d}$  be a vector such that

$|\vec{d} - \vec{a}| = \sqrt{11}$ ,  $|\vec{c} \times \vec{d}| = 3$  and the angle between  $\vec{c}$  and  $\vec{d}$  is  $\frac{\pi}{4}$ . Then  $\vec{a} \cdot \vec{d}$  is equal to

- Options 1. 11  
2. 1  
3. 3  
4. 0

Question Type : MCQ

Question ID : 444792540

Option 1 ID : 4447921845

Option 2 ID : 4447921843

Option 3 ID : 4447921844

Option 4 ID : 4447921842

Status : Answered

Chosen Option : 4

Q.8

The value of  $\frac{\sqrt{3} \operatorname{cosec} 20^\circ - \sec 20^\circ}{\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ}$  is equal to

- Options 1. 12  
2. 32  
3. 64  
4. 16

Question Type : MCQ

Question ID : 444792539

Option 1 ID : 4447921839

Option 2 ID : 4447921840

Option 3 ID : 4447921841

Option 4 ID : 4447921838

Status : Answered

Chosen Option : 3

Q.9 Consider an A.P.:  $a_1, a_2, \dots, a_n$ ;  $a_1 > 0$ . If  $a_2 - a_1 = \frac{-3}{4}$ ,  $a_n = \frac{1}{4}a_1$ , and

$$\sum_{i=1}^n a_i = \frac{525}{2}, \text{ then } \sum_{i=1}^{17} a_i \text{ is equal to}$$

Options 1. 952

2. 238

3. 476

4. 136

Question Type : MCQ

Question ID : 444792531

Option 1 ID : 4447921809

Option 2 ID : 4447921807

Option 3 ID : 4447921808

Option 4 ID : 4447921806

Status : Answered

Chosen Option : 2

Q.10 If  $\cot x = \frac{5}{12}$  for some  $x \in \left(\pi, \frac{3\pi}{2}\right)$ , then

$$\sin 7x \left( \cos \frac{13x}{2} + \sin \frac{13x}{2} \right) + \cos 7x \left( \cos \frac{13x}{2} - \sin \frac{13x}{2} \right) \text{ is equal to}$$

Options

1.  $\frac{5}{\sqrt{13}}$

2.  $\frac{1}{\sqrt{13}}$

3.  $\frac{6}{\sqrt{26}}$

4.  $\frac{4}{\sqrt{26}}$

Question Type : MCQ

Question ID : 444792537

Option 1 ID : 4447921832

Option 2 ID : 4447921833

Option 3 ID : 4447921830

Option 4 ID : 4447921831

Status : Answered

Chosen Option : 1

Q.11 Let R be a relation defined on the set  $\{1, 2, 3, 4\} \times \{1, 2, 3, 4\}$  by

$$R = \{(a, b), (c, d) : 2a + 3b = 3c + 4d\}.$$

Then the number of elements in R is

- Options
1. 18
  2. 12
  3. 15
  4. 6

Question Type : **MCQ**

Question ID : **444792526**

Option 1 ID : **4447921789**

Option 2 ID : **4447921787**

Option 3 ID : **4447921788**

Option 4 ID : **4447921786**

Status : **Not Answered**

Chosen Option : --

Q.12

Let  $S = \frac{1}{25!} + \frac{1}{3!23!} + \frac{1}{5!21!} + \dots$  up to 13 terms. If  $13S = \frac{2^k}{n!}$ ,  $k \in \mathbb{N}$ , then

$n + k$  is equal to

- Options
1. 49
  2. 51
  3. 52
  4. 50

Question Type : **MCQ**

Question ID : **444792532**

Option 1 ID : **4447921810**

Option 2 ID : **4447921812**

Option 3 ID : **4447921813**

Option 4 ID : **4447921811**

Status : **Answered**

Chosen Option : 1

Q.13

$$\text{Let } S = \left\{ z \in \mathbb{C} : \left| \frac{z-6i}{z-2i} \right| = 1 \text{ and } \left| \frac{z-8+2i}{z+2i} \right| = \frac{3}{5} \right\}.$$

Then  $\sum_{z \in S} |z|^2$  is equal to

- Options
1. 423
  2. 385
  3. 413
  4. 398

Question Type : MCQ

Question ID : 444792528

Option 1 ID : 4447921797

Option 2 ID : 4447921794

Option 3 ID : 4447921796

Option 4 ID : 4447921795

Status : Not Answered

Chosen Option : --

Q.14

Let a circle of radius 4 pass through the origin O, the points  $A(-\sqrt{3}a, 0)$  and  $B(0, -\sqrt{2}b)$ , where  $a$  and  $b$  are real parameters and  $ab \neq 0$ . Then the locus of the centroid of  $\triangle OAB$  is a circle of radius

- Options
1.  $\frac{5}{3}$
  2.  $\frac{7}{3}$
  3.  $\frac{11}{3}$
  4.  $\frac{8}{3}$

Question Type : MCQ

Question ID : 444792536

Option 1 ID : 4447921826

Option 2 ID : 4447921827

Option 3 ID : 4447921829

Option 4 ID : 4447921828

Status : Answered

Chosen Option : 4

**Q.15** Let 729, 81, 9, 1, ... be a sequence and  $P_n$  denote the product of the first  $n$  terms of this sequence.

$$\text{If } 2 \sum_{n=1}^{40} (P_n)^{\frac{1}{n}} = \frac{3^\alpha - 1}{3^\beta} \text{ and } \gcd(\alpha, \beta) = 1, \text{ then}$$

$\alpha + \beta$  is equal to

- Options
1. 76
  2. 74
  3. 73
  4. 75

Question Type : **MCQ**

Question ID : **444792529**

Option 1 ID : **4447921801**

Option 2 ID : **4447921799**

Option 3 ID : **4447921798**

Option 4 ID : **4447921800**

Status : **Answered**

Chosen Option : **3**

**Q.16** The mean and variance of a data of 10 observations are 10 and 2, respectively. If an observations  $\alpha$  in this data is replaced by  $\beta$ , then the mean and variance become 10.1 and 1.99, respectively. Then  $\alpha + \beta$  equals

- Options
1. 5
  2. 15
  3. 20
  4. 10

Question Type : **MCQ**

Question ID : **444792533**

Option 1 ID : **4447921814**

Option 2 ID : **4447921816**

Option 3 ID : **4447921817**

Option 4 ID : **4447921815**

Status : **Answered**

Chosen Option : **3**

Q.17

Let each of the two ellipses  $E_1 : \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, (a > b)$  and

$E_2 : \frac{x^2}{A^2} + \frac{y^2}{B^2} = 1, (A < B)$  have eccentricity  $\frac{4}{5}$ . Let the lengths of the latus

recta of  $E_1$  and  $E_2$  be  $l_1$  and  $l_2$ , respectively, such that  $2l_1^2 = 9l_2$ . If the distance between the foci of  $E_1$  is 8, then the distance between the foci of  $E_2$  is

Options

1.  $\frac{8}{5}$
2.  $\frac{96}{5}$
3.  $\frac{16}{5}$
4.  $\frac{32}{5}$

Question Type : MCQ

Question ID : 444792535

Option 1 ID : 4447921822

Option 2 ID : 4447921825

Option 3 ID : 4447921823

Option 4 ID : 4447921824

Status : Not Answered

Chosen Option : --

Q.18

Let  $A(1, 0)$ ,  $B(2, -1)$  and  $C\left(\frac{7}{3}, \frac{4}{3}\right)$  be three points. If the equation of the bisector of the angle  $ABC$  is  $\alpha x + \beta y = 5$ , then the value of  $\alpha^2 + \beta^2$  is

Options

1. 13
2. 8
3. 10
4. 5

Question Type : MCQ

Question ID : 444792538

Option 1 ID : 4447921837

Option 2 ID : 4447921835

Option 3 ID : 4447921836

Option 4 ID : 4447921834

Status : Answered

Chosen Option : 3

**Q.19** Let the lines  $L_1 : \vec{r} = \hat{i} + 2\hat{j} + 3\hat{k} + \lambda(2\hat{i} + 3\hat{j} + 4\hat{k})$ ,  $\lambda \in \mathbb{R}$  and  $L_2 : \vec{r} = (4\hat{i} + \hat{j}) + \mu(5\hat{i} + 2\hat{j} + \hat{k})$ ,  $\mu \in \mathbb{R}$ , intersect at the point R. Let P and Q be the points lying on lines  $L_1$  and  $L_2$ , respectively, such that  $|\overline{PR}| = \sqrt{29}$  and  $|\overline{PQ}| = \sqrt{\frac{47}{3}}$ . If the point P lies in the first octant, then  $27(QR)^2$  is equal to

- Options**
1. 320
  2. 348
  3. 340
  4. 360

Question Type : **MCQ**  
 Question ID : **444792541**  
 Option 1 ID : **4447921846**  
 Option 2 ID : **4447921848**  
 Option 3 ID : **4447921847**  
 Option 4 ID : **4447921849**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.20** Let  $A_1$  be the bounded area enclosed by the curves  $y = x^2 + 2$ ,  $x + y = 8$  and y-axis that lies in the first quadrant. Let  $A_2$  be the bounded area enclosed by the curves  $y = x^2 + 2$ ,  $y^2 = x$ ,  $x = 2$ , and y-axis that lies in the first quadrant. Then  $A_1 - A_2$  is equal to

- Options**
1.  $\frac{2}{3}(3\sqrt{2} + 1)$
  2.  $\frac{2}{3}(4\sqrt{2} + 1)$
  3.  $\frac{2}{3}(\sqrt{2} + 1)$
  4.  $\frac{2}{3}(2\sqrt{2} + 1)$

Question Type : **MCQ**  
 Question ID : **444792545**  
 Option 1 ID : **4447921864**  
 Option 2 ID : **4447921865**  
 Option 3 ID : **4447921862**  
 Option 4 ID : **4447921863**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.21** The number of  $3 \times 2$  matrices  $A$ , which can be formed using the elements of the set  $\{-2, -1, 0, 1, 2\}$  such that the sum of all the diagonal elements of  $A^T A$  is 5, is \_\_\_\_\_

Given **312**  
Answer :

Question Type : **SA**  
Question ID : **444792546**  
Status : **Answered**

**Q.22** Let  $(2\alpha, \alpha)$  be the largest interval in which the function  $f(t) = \frac{|t+1|}{t^2}$ ,  $t < 0$ , is strictly decreasing. Then the local maximum value of the function  $g(x) = 2 \log_e(x-2) + \alpha x^2 + 4x - \alpha$ ,  $x > 2$ , is \_\_\_\_\_

Given **2**  
Answer :

Question Type : **SA**  
Question ID : **444792549**  
Status : **Answered**

**Q.23** The number of numbers greater than 5000, less than 9000 and divisible by 3, that can be formed using the digits 0, 1, 2, 5, 9, if the repetition of the digits is allowed, is \_\_\_\_\_

Given **6**  
Answer :

Question Type : **SA**  
Question ID : **444792547**  
Status : **Answered**

**Q.24** Let a line  $L$  passing through the point  $P(1,1,1)$  be perpendicular to the lines  $\frac{x-4}{4} = \frac{y-1}{1} = \frac{z-1}{1}$  and  $\frac{x-17}{1} = \frac{y-71}{1} = \frac{z}{0}$ . Let the line  $L$  intersect the  $yz$ -plane at the point  $Q$ . Another line parallel to  $L$  and passing through the point  $S(1, 0, -1)$  intersects the  $yz$ -plane at the point  $R$ . Then the square of the area of the parallelogram  $PQRS$  is equal to \_\_\_\_\_.

Given **6**  
Answer :

Question Type : **SA**  
Question ID : **444792548**  
Status : **Answered**

Q.25

Let a differentiable function  $f$  satisfy the equation  $\int_0^{36} f\left(\frac{tx}{36}\right) dt = 4\alpha f(x)$ .

If  $y = f(x)$  is a standard parabola passing through the points  $(2, 1)$  and  $(-4, \beta)$ , then  $\beta^\alpha$  is equal to \_\_\_\_\_.

Given 4

Answer :

Question Type : SA

Question ID : 444792550

Status : Answered

Section : Physics Section A

Q.26 A cylindrical block of mass  $M$  and area of cross section  $A$  is floating in a liquid of density  $\rho$  and with its axis vertical. When depressed a little and released the block starts oscillating. The period of oscillation is \_\_\_\_\_.

Options

1.  $\pi \sqrt{\frac{2M}{\rho Ag}}$

2.  $2\pi \sqrt{\frac{M}{\rho Ag}}$

3.  $2\pi \sqrt{\frac{\rho A}{Mg}}$

4.  $\pi \sqrt{\frac{\rho A}{Mg}}$

Question Type : MCQ

Question ID : 444792559

Option 1 ID : 4447921904

Option 2 ID : 4447921903

Option 3 ID : 4447921905

Option 4 ID : 4447921906

Status : Answered

Chosen Option : 2

Q.27 Match the LIST-I with LIST-II

List-I		List-II	
A.	Magnetic induction	I.	$MLT^{-2}A^{-2}$
B.	Magnetic flux	II.	$ML^2T^{-2}A^{-2}$
C.	Magnetic permeability	III.	$ML^0T^{-2}A^{-1}$
D.	Self inductance	IV.	$ML^2T^{-2}A^{-1}$

Choose the *correct* answer from the options given below:

- Options
1. A-III, B-IV, C-II, D-I
  2. A-I, B-III, C-IV, D-II
  3. A-IV, B-III, C-I, D-II
  4. A-III, B-IV, C-I, D-II

Question Type : MCQ

Question ID : 444792551

Option 1 ID : 4447921871

Option 2 ID : 4447921873

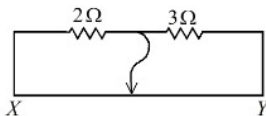
Option 3 ID : 4447921872

Option 4 ID : 4447921874

Status : Answered

Chosen Option : 4

Q.28 Two resistors  $2\ \Omega$  and  $3\ \Omega$  are connected in the gaps of bridge as shown in figure. The null point is obtained with the contact of jockey at some point on wire  $XY$ . When an unknown resistor is connected in parallel with  $3\ \Omega$  resistor, the null point is shifted by  $22.5\ \text{cm}$  toward  $Y$ . The resistance of unknown resistor is \_\_\_\_\_  $\Omega$ .



- Options
1. 3
  2. 1
  3. 2
  4. 4

Question Type : MCQ

Question ID : 444792553

Option 1 ID : 4447921881

Option 2 ID : 4447921879

Option 3 ID : 4447921880

Option 4 ID : 4447921882

Status : Answered

Chosen Option : 3

**Q.29** Three masses 200 kg, 300 kg and 400 kg are placed at the vertices of an equilateral triangle with sides 20 m. They are rearranged on the vertices of a bigger triangle of side 25 m and with the same centre. The work done in this process \_\_\_\_\_ J.  
(Gravitational constant  $G = 6.7 \times 10^{-11} \text{ N m}^2/\text{kg}^2$ )

- Options
1.  $2.85 \times 10^{-7}$
  2.  $1.74 \times 10^{-7}$
  3.  $4.77 \times 10^{-7}$
  4.  $9.86 \times 10^{-6}$

Question Type : **MCQ**  
Question ID : **444792554**  
Option 1 ID : **4447921885**  
Option 2 ID : **4447921886**  
Option 3 ID : **4447921883**  
Option 4 ID : **4447921884**  
Status : **Answered**  
Chosen Option : **2**

**Q.30** A spring of force constant 15 N/m is cut into two pieces. If the ratio of their length is 1:3, then the force constant of smaller piece is \_\_\_\_\_ N/m.

- Options
1. 20
  2. 45
  3. 15
  4. 60

Question Type : **MCQ**  
Question ID : **444792552**  
Option 1 ID : **4447921875**  
Option 2 ID : **4447921876**  
Option 3 ID : **4447921878**  
Option 4 ID : **4447921877**  
Status : **Answered**  
Chosen Option : **1**

**Q.31** The electrostatic potential in a charged spherical region of radius  $r$  varies as  $V = ar^3 + b$ , where  $a$  and  $b$  are constants. The total charge in the sphere of unit radius is  $\alpha \times \pi a \epsilon_0$ . The value of  $\alpha$  is \_\_\_\_\_.  
(permittivity of vacuum is  $\epsilon_0$ )

- Options
1. - 12
  2. - 9
  3. - 8
  4. - 6

Question Type : **MCQ**  
Question ID : **444792560**  
Option 1 ID : **4447921907**  
Option 2 ID : **4447921910**  
Option 3 ID : **4447921909**  
Option 4 ID : **4447921908**  
Status : **Answered**  
Chosen Option : **1**

**Q.32** A boy throws a ball into air at  $45^\circ$  from the horizontal to land it on a roof of a building of height  $H$ . If the ball attains maximum height in 2 s and lands on the building in 3 s after launch, then value of  $H$  is \_\_\_\_\_ m.

( $g = 10 \text{ m/s}^2$ )

- Options
1. 20
  2. 25
  3. 10
  4. 15

Question Type : **MCQ**  
Question ID : **444792555**  
Option 1 ID : **4447921889**  
Option 2 ID : **4447921888**  
Option 3 ID : **4447921890**  
Option 4 ID : **4447921887**  
Status : **Answered**  
Chosen Option : **4**

**Q.33** Two resistors of  $100 \Omega$  each are connected in series with a 9 V battery. A voltmeter of  $400 \Omega$  resistance is connected to measure the voltage drop across one of the resistors. The voltmeter reading is \_\_\_\_\_ V.

- Options
1. 3
  2. 4.5
  3. 4
  4. 2

Question Type : **MCQ**  
Question ID : **444792561**  
Option 1 ID : **4447921912**  
Option 2 ID : **4447921914**  
Option 3 ID : **4447921913**  
Option 4 ID : **4447921911**  
Status : **Answered**  
Chosen Option : **3**

Q.34 Match the LIST-I with LIST-II

List-I		List-II	
A.	Radio-wave	I.	is produced by Magnetron valve
B.	Micro-wave	II.	due to change in the vibrational modes of atoms
C.	Infrared-wave	III.	due to inner shell electrons moving from higher energy level to lower energy level
D.	X-ray	IV.	due to rapid acceleration of electrons

Choose the *correct* answer from the options given below:

- Options
1. A-II, B-IV, C-III, D-I
  2. A-IV, B-III, C-I, D-II
  3. A-IV, B-II, C-I, D-III
  4. A-IV, B-I, C-II, D-III

Question Type : MCQ

Question ID : 444792565

Option 1 ID : 4447921929

Option 2 ID : 4447921927

Option 3 ID : 4447921930

Option 4 ID : 4447921928

Status : Marked For Review

Chosen Option : 1

Q.35 The exit surface of a prism with refractive index  $n$  is coated with a material having refractive index  $\frac{n}{2}$ . When this prism is set for minimum angle of deviation, it exactly meets the condition of critical angle. The prism angle is \_\_\_\_\_.

- Options
1.  $60^\circ$
  2.  $15^\circ$
  3.  $30^\circ$
  4.  $45^\circ$

Question Type : MCQ

Question ID : 444792568

Option 1 ID : 4447921941

Option 2 ID : 4447921939

Option 3 ID : 4447921940

Option 4 ID : 4447921942

Status : Marked For Review

Chosen Option : 1

**Q.36** In a microscope of tube length 10 cm two convex lenses are arranged with focal length of 2 cm and 5 cm. Total magnification obtained with this system for normal adjustment is  $(5)^k$ . The value of  $k$  is \_\_\_\_\_.

- Options
1. 4
  2. 5
  3. 3.5
  4. 2

Question Type : **MCQ**  
Question ID : **444792567**  
Option 1 ID : **4447921935**  
Option 2 ID : **4447921937**  
Option 3 ID : **4447921938**  
Option 4 ID : **4447921936**  
Status : **Answered**  
Chosen Option : 4

**Q.37** Three charges  $+2q$ ,  $+3q$  and  $-4q$  are situated at  $(0, -3a)$ ,  $(2a, 0)$  and  $(-2a, 0)$  respectively in the  $x y$  plane. The resultant dipole moment about origin is \_\_\_\_\_.

- Options
1.  $2qa(7\hat{i} - 3\hat{j})$
  2.  $2qa(3\hat{i} - 7\hat{j})$
  3.  $2qa(3\hat{j} - \hat{i})$
  4.  $2qa(3\hat{j} - 7\hat{i})$

Question Type : **MCQ**  
Question ID : **444792564**  
Option 1 ID : **4447921923**  
Option 2 ID : **4447921925**  
Option 3 ID : **4447921924**  
Option 4 ID : **4447921926**  
Status : **Answered**  
Chosen Option : 1

**Q.38** There are three co-centric conducting spherical shells  $A$ ,  $B$  and  $C$  of radii  $a$ ,  $b$  and  $c$  respectively ( $c > b > a$ ) and they are charged with charge  $q_1$ ,  $q_2$  and  $q_3$  respectively. The potentials of the spheres  $A$ ,  $B$  and  $C$  respectively, are :

Options 1.

$$\frac{1}{4\pi\epsilon_0} \left( \frac{q_1}{a} + \frac{q_2}{b} + \frac{q_3}{c} \right), \frac{1}{4\pi\epsilon_0} \left( \frac{q_1+q_2}{b} + \frac{q_3}{c} \right), \frac{1}{4\pi\epsilon_0} \left( \frac{q_1+q_2+q_3}{c} \right)$$

2.

$$\frac{1}{4\pi\epsilon_0} \left( \frac{q_1+q_2+q_3}{a} \right), \frac{1}{4\pi\epsilon_0} \left( \frac{q_1+q_2+q_3}{b} \right), \frac{1}{4\pi\epsilon_0} \left( \frac{q_1+q_2+q_3}{c} \right)$$

3.

$$\frac{1}{4\pi\epsilon_0} \left( \frac{q_1+q_2+q_3}{a} \right), \frac{1}{4\pi\epsilon_0} \left( \frac{q_1+q_2}{b} + \frac{q_3}{c} \right), \frac{1}{4\pi\epsilon_0} \left( \frac{q_1}{a} + \frac{q_2}{b} + \frac{q_3}{c} \right)$$

4.

$$\frac{1}{4\pi\epsilon_0} \left( \frac{q_1}{a} + \frac{q_2}{b} + \frac{q_3}{c} \right), \frac{1}{4\pi\epsilon_0} \left( \frac{q_1+q_2+q_3}{b} \right), \frac{1}{4\pi\epsilon_0} \left( \frac{q_1+q_2+q_3}{c} \right)$$

Question Type : **MCQ**

Question ID : **444792563**

Option 1 ID : **4447921920**

Option 2 ID : **4447921921**

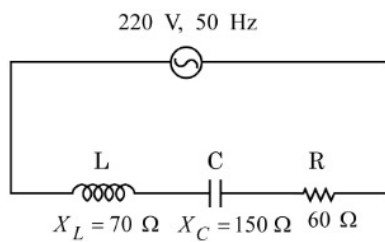
Option 3 ID : **4447921922**

Option 4 ID : **4447921919**

Status : **Answered**

Chosen Option : **1**

**Q.39** For the series  $LCR$  circuit connected with 220 V, 50 Hz a.c source as shown in the figure, the power factor is  $\frac{a}{10}$ . The value of  $a$  is \_\_\_\_\_.



Options 1. **6**

2. **4**

3. **10**

4. **8**

Question Type : **MCQ**

Question ID : **444792562**

Option 1 ID : **4447921916**

Option 2 ID : **4447921915**

Option 3 ID : **4447921918**

Option 4 ID : **4447921917**

Status : **Answered**

Chosen Option : **1**

**Q.40** Two masses 400 g and 350 g are suspended from the ends of a light string passing over a heavy pulley of radius 2 cm. When released from rest the heavier mass is observed to fall 81 cm in 9 s. The rotational inertia of the pulley is \_\_\_\_\_ kg.m<sup>2</sup>.  
(g = 9.8 m/s<sup>2</sup>)

- Options**
1.  $4.75 \times 10^{-3}$
  2.  $1.86 \times 10^{-2}$
  3.  $9.5 \times 10^{-3}$
  4.  $8.3 \times 10^{-3}$

Question Type : **MCQ**

Question ID : **444792556**

Option 1 ID : **4447921894**

Option 2 ID : **4447921893**

Option 3 ID : **4447921892**

Option 4 ID : **4447921891**

Status : **Not Answered**

Chosen Option : --

**Q.41** A brass wire of length 2 m and radius 1 mm at 27 °C is held taut between two rigid supports. Initially it was cooled to a temperature of -43 °C creating a tension  $T$  in the wire. The temperature to which the wire has to be cooled in order to increase the tension in it to  $1.4T$ , is \_\_\_\_\_ °C.

- Options**
1. **-65**
  2. **-80**
  3. **-71**
  4. **-86**

Question Type : **MCQ**

Question ID : **444792558**

Option 1 ID : **4447921902**

Option 2 ID : **4447921901**

Option 3 ID : **4447921900**

Option 4 ID : **4447921899**

Status : **Answered**

Chosen Option : **3**

**Q.42** Given below are two statements:

**Statement I:** For all elements, greater the mass of the nucleus, greater is the binding energy per nucleon.

**Statement II:** For all elements, nuclei with less binding energy per nucleon transforms to nuclei with greater binding energy per nucleon.

In the light of the above statements, choose the *correct* answer from the options given below

- Options
1. Statement I is true but Statement II is false
  2. Both Statement I and Statement II are false
  3. Both Statement I and Statement II are true
  4. Statement I is false but Statement II is true

Question Type : **MCQ**  
Question ID : **444792569**  
Option 1 ID : **4447921945**  
Option 2 ID : **4447921944**  
Option 3 ID : **4447921943**  
Option 4 ID : **4447921946**  
Status : **Answered**  
Chosen Option : **4**

**Q.43** Density of water at 4 °C and 20 °C are 1000 kg/m<sup>3</sup> and 998 kg/m<sup>3</sup> respectively.

The increase in internal energy of 4 kg of water when it is heated from 4 °C to 20 °C is \_\_\_\_\_ J.

(specific heat capacity of water = 4.2 J / kg. and 1 atmospheric pressure = 10<sup>5</sup> Pa)

- Options
1. 234699.2
  2. 315826.2
  3. 268799.2
  4. 258700.8

Question Type : **MCQ**  
Question ID : **444792557**  
Option 1 ID : **4447921898**  
Option 2 ID : **4447921896**  
Option 3 ID : **4447921897**  
Option 4 ID : **4447921895**  
Status : **Answered**  
Chosen Option : **3**

**Q.44** Two electrons are moving in orbits of two hydrogen like atoms with speeds  $3 \times 10^5$  m/s and  $2.5 \times 10^5$  m/s respectively. If the radii of these orbits are nearly same then the possible order of energy states are \_\_\_\_\_ respectively.

- Options
1. 10 and 12
  2. 8 and 10
  3. 9 and 8
  4. 6 and 5

Question Type : **MCQ**  
Question ID : **444792570**  
Option 1 ID : **4447921948**  
Option 2 ID : **4447921950**  
Option 3 ID : **4447921947**  
Option 4 ID : **4447921949**  
Status : **Not Answered**  
Chosen Option : --

**Q.45** An unpolarised light is incident at an interface of two dielectric media having refractive indices of 2 (incident medium) and  $2\sqrt{3}$  (medium) respectively. To satisfy the condition that reflected and refracted rays are perpendicular to each other, the angle of incidence is \_\_\_\_\_.

- Options
1.  $30^\circ$
  2.  $10^\circ$
  3.  $45^\circ$
  4.  $60^\circ$

Question Type : **MCQ**  
Question ID : **444792566**  
Option 1 ID : **4447921933**  
Option 2 ID : **4447921934**  
Option 3 ID : **4447921932**  
Option 4 ID : **4447921931**  
Status : **Answered**  
Chosen Option : **4**

Section : **Physics Section B**

**Q.46** A gas of certain mass filled in a closed cylinder at a pressure of 3.23 kPa has temperature  $50^\circ\text{C}$ . The gas is now heated to double its temperature. The modified pressure is \_\_\_\_ Pa.

Given **6460**  
Answer :

Question Type : **SA**  
Question ID : **444792574**  
Status : **Answered**

**Q.47** A short bar magnet placed with its axis at  $30^\circ$  with an external field of 800 Gauss, experiences a torque of 0.016 N.m. The work done in moving it from most stable to most unstable position is  $\alpha \times 10^{-3}$  J. The value of  $\alpha$  is \_\_\_\_\_.

Given **64**  
Answer :

Question Type : **SA**  
Question ID : **444792575**  
Status : **Answered**

**Q.48** A voltage regulating circuit consisting of Zener diode, having break-down voltage of 10 V and maximum power dissipation of 0.4 W, is operated at 15 V. The approximate value of protective resistance in this circuit is \_\_\_\_\_  $\Omega$ .

Given **125**  
Answer :

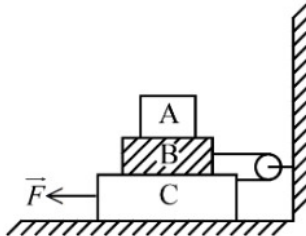
Question Type : **SA**  
Question ID : **444792571**  
Status : **Answered**

**Q.49** Sixty four rain drops of radius 1 mm each falling down with a terminal velocity of 10 cm/s coalesce to form a bigger drop. The terminal velocity of bigger drop is \_\_\_\_\_ cm/s.

Given **160**  
Answer :

Question Type : **SA**  
Question ID : **444792573**  
Status : **Answered**

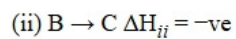
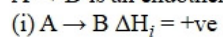
**Q.50** In the given figure the blocks *A*, *B* and *C* weigh 4 kg, 6 kg and 8 kg respectively. The co-efficient of sliding friction between any two surfaces is 0.5. The force  $\vec{F}$  required to slide the block *C* with constant speed is \_\_\_\_\_ N. (Use  $g = 10 \text{ m/s}^2$ )



Given **210**  
Answer :

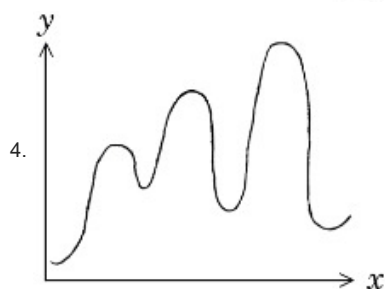
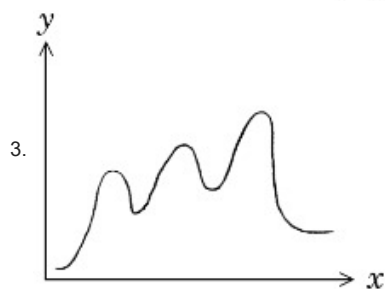
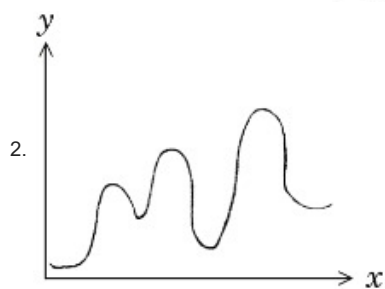
Question Type : **SA**  
Question ID : **444792572**  
Status : **Answered**

**Q.51**  $A \rightarrow D$  is an endothermic reaction occurring in three steps (elementary).



Which of the following graphs between potential energy (y-axis) vs reaction coordinate (x-axis) correctly represents the reaction profile of  $A \rightarrow D$ ?

Options



Question Type : **MCQ**

Question ID : **444792582**

Option 1 ID : **4447921982**

Option 2 ID : **4447921980**

Option 3 ID : **4447921983**

Option 4 ID : **4447921981**

Status : **Answered**

Chosen Option : **4**

**Q.52** Given below are two statements:

**Statement I:** Hybridisation, shape and spin only magnetic moment of  $K_3[Co(CO_3)_3]$  is  $sp^3d^2$ , octahedral and 4.9 BM respectively.

**Statement II:** Geometry, hybridisation and spin only magnetic moment values (BM) of the ions  $[Ni(CN)_4]^{2-}$ ,  $[MnBr_4]^{2-}$  and  $[CoF_6]^{3-}$  respectively are square planar, tetrahedral, octahedral;  $dsp^2$ ,  $sp^3$ ,  $sp^3d^2$  and 0, 5.9, 4.9.

In the light of the above statements, choose the *correct* answer from the options given below

- Options
1. Statement I is true but Statement II is false
  2. Statement I is false but Statement II is true
  3. Both Statement I and Statement II are true
  4. Both Statement I and Statement II are false

Question Type : **MCQ**

Question ID : **444792585**

Option 1 ID : **4447921994**

Option 2 ID : **4447921995**

Option 3 ID : **4447921992**

Option 4 ID : **4447921993**

Status : **Answered**

Chosen Option : **3**

Q.53 Match the LIST-I with LIST-II

List-I Isothermal process for ideal gas system		List-II Work done ( $V_f > V_i$ )	
A.	Reversible expansion	I.	$w = 0$
B.	Free expansion	II.	$w = -nRT \ln \frac{V_f}{V_i}$
C.	Irreversible expansion	III.	$w = -P_{\text{ex}}(V_f - V_i)$
D.	Irreversible compression	IV.	$w = -P_{\text{ex}}(V_i - V_f)$

Choose the *correct* answer from the options given below:

- Options
1. A-II, B-I, C-III, D-IV
  2. A-I, B-III, C-II, D-IV
  3. A-IV, B-I, C-III, D-II
  4. A-IV, B-II, C-III, D-I

Question Type : MCQ

Question ID : 444792577

Option 1 ID : 4447921961

Option 2 ID : 4447921963

Option 3 ID : 4447921962

Option 4 ID : 4447921960

Status : Answered

Chosen Option : 1

**Q.54** Given below are statements about some molecules/ions.

Identify the **CORRECT** statements.

- A. The dipole moment value of  $\text{NF}_3$  is higher than that of  $\text{NH}_3$ .
- B. The dipole moment value of  $\text{BeH}_2$  is zero.
- C. The bond order of  $\text{O}_2^{2-}$  and  $\text{F}_2$  is same.
- D. The formal charge on the central oxygen atom of ozone is  $-1$ .
- E. In  $\text{NO}_2$ , all the three atoms satisfy the octet rule, hence it is very stable.

Choose the *correct* answer from the options given below:

- Options
1. B, C & D Only
  2. A, B, C, D & E
  3. B & C Only
  4. A, C & D Only

Question Type : **MCQ**

Question ID : **444792578**

Option 1 ID : **4447921966**

Option 2 ID : **4447921964**

Option 3 ID : **4447921965**

Option 4 ID : **4447921967**

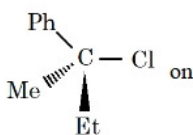
Status : **Answered**

Chosen Option : **3**

**Q.55** Given below are two statements:

**Statement I:** 'C - Cl' bond is stronger in  $\text{CH}_2 = \text{CH} - \text{Cl}$  than  $\text{CH}_3 - \text{CH}_2 - \text{Cl}$

**Statement II:** The given optically active molecule,



hydrolysis gives a solution that can rotate the plane polarized light.

In the light of the above statements, choose the *correct* answer from the options given below

- Options
1. Both Statement I and Statement II are false
  2. Statement I is false but Statement II is true
  3. Both Statement I and Statement II are true
  4. Statement I is true but Statement II is false

Question Type : **MCQ**

Question ID : **444792590**

Option 1 ID : **4447922013**

Option 2 ID : **4447922015**

Option 3 ID : **4447922012**

Option 4 ID : **4447922014**

Status : **Answered**

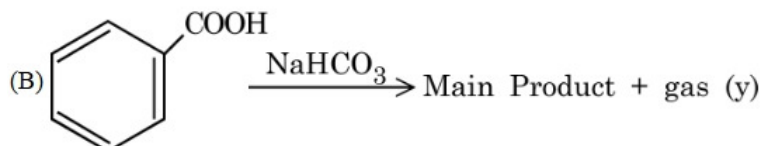
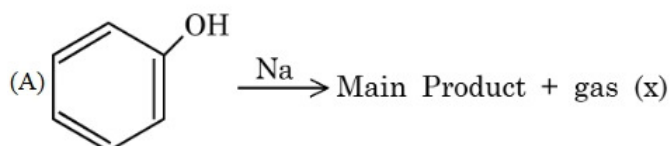
Chosen Option : **3**

**Q.56** 'W' g of a non-volatile electrolyte solid solute of molar mass 'M' g mol<sup>-1</sup> when dissolved in 100 mL water, decreases vapour pressure of water from 640 mm Hg to 600 mm Hg. If aqueous solution of the electrolyte boils at 375 K and K<sub>b</sub> for water is 0.52 K kg mol<sup>-1</sup>, then the mole fraction of the electrolyte solute (x<sub>2</sub>) in the solution can be expressed as  
(Given : density of water = 1 g/mL and boiling point of water = 373 K)

- Options
1.  $\frac{1.3}{8} \times \frac{W}{M}$
  2.  $\frac{16}{2.6} \times \frac{W}{M}$
  3.  $\frac{2.6}{16} \times \frac{M}{W}$
  4.  $\frac{1.3}{8} \times \frac{M}{W}$

Question Type : **MCQ**  
 Question ID : **444792580**  
 Option 1 ID : **4447921974**  
 Option 2 ID : **4447921975**  
 Option 3 ID : **4447921973**  
 Option 4 ID : **4447921972**  
 Status : **Answered**  
 Chosen Option : **3**

**Q.57** Consider the following two reactions A and B.

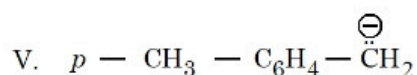
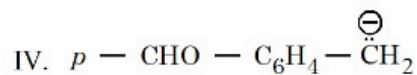
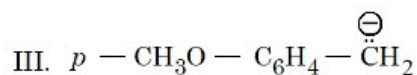
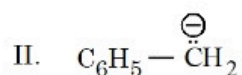
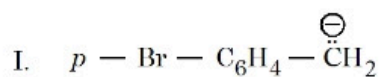


Numerical value of [molar mass of x + molar mass of y] is \_\_\_\_.

- Options
1. 160
  2. 88
  3. 4
  4. 46

Question Type : **MCQ**  
 Question ID : **444792592**  
 Option 1 ID : **4447922021**  
 Option 2 ID : **4447922022**  
 Option 3 ID : **4447922023**  
 Option 4 ID : **4447922020**  
 Status : **Answered**  
 Chosen Option : **4**

Q.58 Arrange the following carbanions in the decreasing order of stability.



Choose the **correct** answer from the options given below:

- Options
1. IV > I > II > V > III
  2. I > II > IV > V > III
  3. IV > II > I > III > V
  4. I > IV > II > V > III

Question Type : MCQ

Question ID : 444792588

Option 1 ID : 4447922004

Option 2 ID : 4447922007

Option 3 ID : 4447922005

Option 4 ID : 4447922006

Status : Answered

Chosen Option : 1

Q.59 A hydroxy compound (X) with molar mass  $122 \text{ g mol}^{-1}$  is acetylated with acetic anhydride, using a large excess of the reagent ensuring complete acetylation of all hydroxyl groups. The product obtained has a molar mass of  $290 \text{ g mol}^{-1}$ . The number of hydroxyl groups present in compound (X) is:

- Options
1. 3
  2. 5
  3. 2
  4. 4

Question Type : MCQ

Question ID : 444792594

Option 1 ID : 4447922028

Option 2 ID : 4447922029

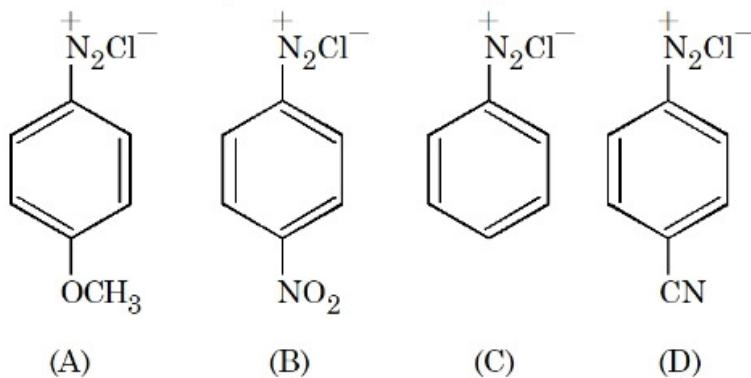
Option 3 ID : 4447922030

Option 4 ID : 4447922031

Status : Answered

Chosen Option : 4

Q.60 The correct stability order of the following diazonium salts is



- Options
1.  $A > C > D > B$
  2.  $C > D > B > A$
  3.  $A > B > C > D$
  4.  $C > A > D > B$

Question Type : MCQ

Question ID : 444792593

Option 1 ID : 4447922025

Option 2 ID : 4447922027

Option 3 ID : 4447922024

Option 4 ID : 4447922026

Status : Answered

Chosen Option : 1

Q.61 Consider three metal chlorides x, y and z, where x is water soluble at room temperature, y is sparingly soluble in water at room temperature and z is soluble in hot water. x, y and z are respectively

- Options
1.  $\text{CuCl}_2$ ,  $\text{AgCl}$  and  $\text{PbCl}_2$
  2.  $\text{MgCl}_2$ ,  $\text{AgCl}$  and  $\text{AlCl}_3$
  3.  $\text{AlCl}_3$ ,  $\text{PbCl}_2$  and  $\text{BaCl}_2$
  4.  $\text{AgCl}$ ,  $\text{Hg}_2\text{Cl}_2$  and  $\text{PbCl}_2$

Question Type : MCQ

Question ID : 444792595

Option 1 ID : 4447922033

Option 2 ID : 4447922035

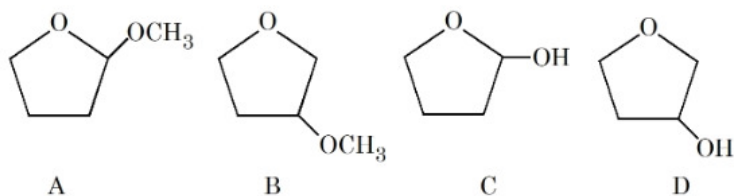
Option 3 ID : 4447922032

Option 4 ID : 4447922034

Status : Answered

Chosen Option : 1

Q.62 A student is given one compound among the following compounds that gives positive test with Tollen's reagent.



The compound is :

- Options
1. C
  2. B
  3. D
  4. A

Question Type : MCQ  
Question ID : 444792587  
Option 1 ID : 4447922002  
Option 2 ID : 4447922001  
Option 3 ID : 4447922003  
Option 4 ID : 4447922000  
Status : Answered  
Chosen Option : 1

Q.63 Among the following, the CORRECT combinations are

1. A.  $\text{IF}_3 \rightarrow \text{T-shaped (sp}^3\text{d)}$
2. B.  $\text{IF}_5 \rightarrow \text{Square pyramidal (sp}^3\text{d}^2)$
3. C.  $\text{IF}_7 \rightarrow \text{Pentagonal bipyramidal (sp}^3\text{d}^3)$
4. D.  $\text{ClO}_4^- \rightarrow \text{Square planar (sp}^2\text{d)}$

Choose the *correct* answer from the options given below:

- Options
1. A, B and C Only
  2. B, C and D Only
  3. A and B Only
  4. A, B, C and D

Question Type : MCQ  
Question ID : 444792584  
Option 1 ID : 4447921991  
Option 2 ID : 4447921989  
Option 3 ID : 4447921990  
Option 4 ID : 4447921988  
Status : Answered  
Chosen Option : 1

**Q.64** A solution is prepared by dissolving 0.3 g of a non-volatile non-electrolyte solute 'A' of molar mass  $60 \text{ g mol}^{-1}$  and 0.9 g of a non-volatile non-electrolyte solute 'B' of molar mass  $180 \text{ g mol}^{-1}$  in 100 mL  $\text{H}_2\text{O}$  at  $27^\circ\text{C}$ . Osmotic pressure of the solution will be  
[Given:  $R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$ ]

- Options
1. 0.82 atm
  2. 2.46 atm
  3. 1.23 atm
  4. 1.47 atm

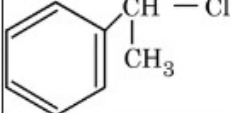
Question Type : **MCQ**  
Question ID : **444792579**  
Option 1 ID : **4447921968**  
Option 2 ID : **4447921971**  
Option 3 ID : **4447921969**  
Option 4 ID : **4447921970**  
Status : **Answered**  
Chosen Option : **2**

**Q.65** Consider a mixture 'X' which is made by dissolving 0.4 mol of  $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Br}$  and 0.4 mol of  $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$  in water to make 4 L of solution. When 2 L of mixture 'X' is allowed to react with excess of  $\text{AgNO}_3$ , it forms precipitate 'Y'. The rest 2 L of mixture 'X' reacts with excess  $\text{BaCl}_2$  to form precipitate 'Z'. Which of the following statements is **CORRECT**?

- Options
1. 'Y' is  $\text{BaSO}_4$  and 'Z' is  $\text{AgBr}$ .
  2. 0.1 mol of 'Y' is formed.
  3. 0.4 mol of 'Z' is formed.
  4. 0.2 mol of 'Z' is formed.

Question Type : **MCQ**  
Question ID : **444792576**  
Option 1 ID : **4447921959**  
Option 2 ID : **4447921957**  
Option 3 ID : **4447921956**  
Option 4 ID : **4447921958**  
Status : **Answered**  
Chosen Option : **4**

Q.66 Match the LIST-I with LIST-II

List-I Chloro derivative		List-II Example	
A.	Vinyl Chloride	I.	$\text{CH}_2 = \text{CH} - \text{CH}_2\text{Cl}$
B.	Benzyl Chloride	II.	$\text{CH}_3 - \text{CH}(\text{Cl})\text{CH}_3$
C.	Alkyl Chloride	III.	$\text{CH}_2 = \text{CHCl}$
D.	Allyl Chloride	IV.	

Choose the *correct* answer from the options given below:

- Options
1. A-I, B-II, C-IV, D-III
  2. A-III, B-IV, C-II, D-I
  3. A-IV, B-I, C-III, D-II
  4. A-III, B-IV, C-I, D-II

Question Type : MCQ

Question ID : 444792591

Option 1 ID : 4447922016

Option 2 ID : 4447922017

Option 3 ID : 4447922019

Option 4 ID : 4447922018

Status : Answered

Chosen Option : 2

Q.67 Given below are two statements:

**Statement I:**  $\text{K} > \text{Mg} > \text{Al} > \text{B}$  is the correct order in terms of metallic character.

**Statement II:** Atomic radius is always greater than the ionic radius for any element.

In the light of the above statements, choose the *correct* answer from the options given below

- Options
1. Statement I is false but Statement II is true
  2. Both Statement I and Statement II are false
  3. Statement I is true but Statement II is false
  4. Both Statement I and Statement II are true

Question Type : MCQ

Question ID : 444792583

Option 1 ID : 4447921987

Option 2 ID : 4447921985

Option 3 ID : 4447921986

Option 4 ID : 4447921984

Status : Marked For Review

Chosen Option : 4

**Q.68** At 27 °C in presence of a catalyst, activation energy of a reaction is lowered by 10 kJ mol<sup>-1</sup>. The logarithm of ratio of  $\frac{k(\text{catalysed})}{k(\text{uncatalysed})}$  is....

(Consider that the frequency factor for both the reactions is same)

- Options**
1. 3.482
  2. 17.41
  3. 0.1741
  4. 1.741

Question Type : **MCQ**

Question ID : **444792581**

Option 1 ID : **4447921979**

Option 2 ID : **4447921978**

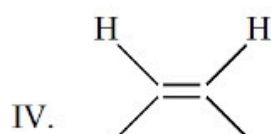
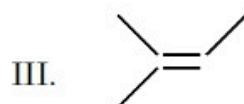
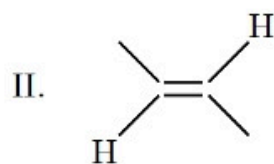
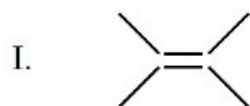
Option 3 ID : **4447921976**

Option 4 ID : **4447921977**

Status : **Answered**

Chosen Option : **4**

Q.69 Arrange the following alkenes in decreasing order of stability.



Choose the *correct* answer from the options given below:

- Options
1. I > III > IV > II
  2. III > I > II > IV
  3. III > II > I > IV
  4. I > III > II > IV

Question Type : MCQ

Question ID : 444792589

Option 1 ID : 4447922011

Option 2 ID : 4447922009

Option 3 ID : 4447922008

Option 4 ID : 4447922010

Status : Answered

Chosen Option : 4

**Q.70** Given below are two statements:

**Statement I:** The number of paramagnetic species among  $[\text{CoF}_6]^{3-}$ ,  $[\text{TiF}_6]^{3-}$ ,  $\text{V}_2\text{O}_5$  and  $[\text{Fe}(\text{CN})_6]^{3-}$  is 3.

**Statement II:**

$\text{K}_4[\text{Fe}(\text{CN})_6] < \text{K}_3[\text{Fe}(\text{CN})_6] < [\text{Fe}(\text{H}_2\text{O})_6] \text{SO}_4 \cdot \text{H}_2\text{O} < [\text{Fe}(\text{H}_2\text{O})_6]\text{Cl}_3$  is the correct order in terms of number of unpaired electron(s) present in the complexes.

In the light of the above statements, choose the *correct* answer from the options given below

- Options
1. Both Statement I and Statement II are false
  2. Both Statement I and Statement II are true
  3. Statement I is true but Statement II is false
  4. Statement I is false but Statement II is true

Question Type : **MCQ**

Question ID : **444792586**

Option 1 ID : **4447921997**

Option 2 ID : **4447921996**

Option 3 ID : **4447921998**

Option 4 ID : **4447921999**

Status : **Answered**

Chosen Option : **2**

Section : **Chemistry Section B**

**Q.71** X and Y are the number of electrons involved, respectively during the oxidation of  $\text{I}^-$  to  $\text{I}_2$  and  $\text{S}^{2-}$  to S by acidified  $\text{K}_2\text{Cr}_2\text{O}_7$ . The value of X + Y is \_\_\_\_.

Given **3**

Answer :

Question Type : **SA**

Question ID : **444792596**

Status : **Answered**

**Q.72** Consider two Group IV metal ions  $\text{X}^{2+}$  and  $\text{Y}^{2+}$ .

A solution containing 0.01 M  $\text{X}^{2+}$  and 0.01 M  $\text{Y}^{2+}$  is saturated with  $\text{H}_2\text{S}$ . The pH at which the metal sulphide YS will form as a precipitate is \_\_\_\_\_. (Nearest integer)

(Given:  $K_{\text{sp}}(\text{XS}) = 1 \times 10^{-22}$  at  $25^\circ\text{C}$ ,  $K_{\text{sp}}(\text{YS}) = 4 \times 10^{-16}$  at  $25^\circ\text{C}$ ,  $[\text{H}_2\text{S}] = 0.1\text{M}$  in solution,  $K_{a1} \times K_{a2}(\text{H}_2\text{S}) = 1.0 \times 10^{-21}$ ,  $\log 2 = 0.30$ ,  $\log 3 = 0.48$ ,  $\log 5 = 0.70$ )

Given **4**

Answer :

Question Type : **SA**

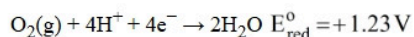
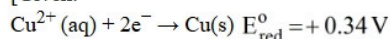
Question ID : **444792599**

Status : **Answered**

**Q.73**

Electricity is passed through an acidic solution of  $\text{Cu}^{2+}$  till all the  $\text{Cu}^{2+}$  was exhausted, leading to the deposition of 300 mg of Cu metal. However, a current of 600 mA was continued to pass through the same solution for another 28 minutes by keeping the total volume of the solution fixed at 200 mL. The total volume of oxygen evolved at STP during the entire process is \_\_\_\_\_ mL. (Nearest integer)

[Given:



Molar mass of Cu =  $63.54 \text{ g mol}^{-1}$

Molar mass of  $\text{O}_2$  =  $32 \text{ g mol}^{-1}$

Faraday Constant =  $96500 \text{ C mol}^{-1}$

Molar volume at STP =  $22.4 \text{ L}$ ]

Given **53**

Answer :

Question Type : **SA**

Question ID : **444792600**

Status : **Answered**

**Q.74**

In Dumas method for estimation of nitrogen, 0.50 g of an organic compound gave 70 mL of nitrogen collected at 300 K and 715 mm pressure. The percentage of nitrogen in the organic compound is \_\_\_\_\_ %.  
(Aqueous tension at 300 K is 15 mm).

Given **14**

Answer :

Question Type : **SA**

Question ID : **444792597**

Status : **Answered**

**Q.75**

The hydrogen spectrum consists of several spectral lines in Lyman series ( $L_1, L_2, L_3, \dots$ ;  $L_1$  has lowest energy among Lyman series). Similarly it consists of several spectral lines in Balmer series ( $B_1, B_2, B_3, \dots$ ;  $B_1$  has lowest energy among Balmer lines). The energy of  $L_1$  is  $x$  times the energy of  $B_1$ . The value of  $x$  is \_\_\_\_\_  $\times 10^{-1}$ . (Nearest integer)

Given **54**

Answer :

Question Type : **SA**

Question ID : **444792598**

Status : **Answered**